Appendix B

Research on Shawangunk Grasslands National Wildlife Refuge
USFWS photo

Compatibility Determinations

- Public Fishing
- Haying
- Wildlife Observation, Nature Photography, Environmental Education and Interpretation
- Grazing
- Archery Deer Hunting
- Research by Non-Service Personnel
- Model Airplane Flying and Competitive Events

COMPATIBILITY DETERMINATION

Use: Public Fishing

Refuge Name: Shawangunk Grasslands National Wildlife Refuge

Establishing and Acquisition Authority: Shawangunk Grasslands National Wildlife Refuge (NWR) was established with a no-cost transfer of the Galeville Army Training Site from the Department of the Army in July 1999. This transfer was authorized under the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471et seq. repealed by Public Law 107-217, August 21, 2002), and the Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667b; Public Law 80-537), as amended.

Refuge Purpose: The official purpose listed in the NWRS national database is to provide its "… particular value in carrying out the national migratory bird management program (16 U.S.C. 667b, An Act Authorizing the Transfer of Certain Real Property for Wildlife).

National Wildlife Refuge System Mission: To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Use:
What is the use? Is the use a priority public use?
The use is public fishing. It is a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997.

Where would the use be conducted?
The only practicable site on the refuge for public fishing is a 1/10-acre man-made pond located approximately one quarter-mile from the refuge's public parking area on Hoagerburgh Road. This site is accessible from the refuge's entrance road. This is the largest pond on the refuge and the only pond open to public access. Further, it is the only aquatic habitat on the refuge capable of sustaining a fishing program. Map 2-1, in Chapter 2 of the draft CCP/EA, illustrates the location of this pond on the refuge.

When would the use be conducted?
Fishing would be permitted throughout the year from 1 hour before official sunrise to 1 hour after official sunset, but would primarily occur from April to October.

How would the use be conducted?
All fishing would be in accordance with State regulations with additional refuge restrictions. We would permit fishing by rod and reel or hook and line only. No bait trapping, stocking of non-native

fish, and fishing competitions would be allowed. A refuge permit would not be required. The small size and narrow width of this pond yields an approximate maximum of 5 anglers at any given time. Given the length of the season, we estimate this would result in 52 fishing-days per year.

Why is the use being proposed?
Providing opportunities for visitors to fish will promote stewardship of our natural resources and increase public appreciation and support for the refuge.

Availability of Resources: Shawangunk Grasslands Refuge is an unstaffed satellite refuge administered by Wallkill River Refuge. No additional equipment, facilities, or improvements will be necessary to implement a fishing program. Further, existing facilities and access for fishing will be maintained to facilitate other currently permitted uses, including wildlife observation, photography, environmental education, and interpretation. A fishing program will create minor staff costs from biological monitoring, law enforcement, and office administration. Staff time would be required to develop the refuge's fishing plan, maintain shoreline access, and contact and educate visitors. Of the costs listed below, which reflect our current total operations costs associated with managing the refuge, approximately 5% would be dedicated to managing a fishing program.

Staff costs	$10,250	0.25 GS 09 FTE
Vehicle fuel	$ 175	($1.40/gal) (2.5 gal/trip) (50 trips)
Equipment, facility use/replacement	$ 1,000	vehicles, mowers, hand tools
TOTAL	$11,425	

Anticipated Impacts of Proposed Actions: Fishing will cause disturbance to wildlife that uses the pond, including waterfowl and shorebirds. However, this very small pond is infrequently used by a very small number of these birds. Discarded fishing line and other fishing litter can entangle migratory birds and mammals and cause injury and death (Gregory 1991). Additionally, litter impacts the visual experience of refuge visitors (Marion and Lime 1986). Law enforcement issues related to fishing include illegal stocking of fish, littering, and fires.

The refuge believes that with the proper management, fishing will not result in any short or long-term impacts that will adversely affect the purpose of the refuge or the mission of the National Wildlife Refuge System.

Public Review and Comment: This draft compatibility determination will be made available for a 45-day public review and comment period in conjunction with release of the draft Comprehensive Conservation Plan/Environmental Assessment for Shawangunk Grasslands Refuge. It is part of Appendix B – Compatibility Determinations in that document.

Determination:

_____**Use is Not Compatible**
__X__**Use is Compatible With the Following Stipulations**

Stipulations Necessary to Ensure Compatibility: Anglers must comply with all State and refuge regulations. We would permit fishing by rod and reel or hook and line only. Use of lead sinkers would not be permitted. Bait trapping, stocking and fishing competitions would not be permitted. A law enforcement presence would be required to prevent illegal stocking of fish, littering and fires.

Justification: The National Wildlife Refuge System Improvement Act of 1997 identifies fishing as a priority public use. Priority public uses are to receive enhanced consideration when developing goals and objectives for refuges if they are determined to be compatible. This use can be conducted without inhibiting the Service's ability to sustain and enhance habitats for grassland-dependent migratory birds and wintering raptors on the refuge. Further, providing fishing opportunities will promote public appreciation and support for the refuge. This activity will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of Shawangunk Grasslands Refuge.

Signature: Refuge Manager: _____ 6/13/06
(Signature and Date)

Concurrence: Regional Chief: _____ June 13, 2006
(Signature and Date)

Mandatory 15-year Re-evaluation Date: June 13, 2021

Literature Cited:

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Marion, J. L. and D. W. Lime. 1986. Recreational resource impacts: visitor perceptions and management responses. Pages 229-235 *in* D. L. Kulhavy and R. N. Conner editors. Wilderness and natural areas in the eastern United States: a management challenge. Center for Applied Studies, Austin State University, Nacogdoches, Texas, USA.

COMPATIBILITY DETERMINATION

Use: Haying

Refuge Name: Shawangunk Grasslands National Wildlife Refuge

Establishing and Acquisition Authority: Shawangunk Grasslands National Wildlife Refuge (NWR) was established with a no-cost transfer of the Galeville Army Training Site from the Department of the Army in July 1999. This transfer was authorized under the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471et seq. repealed by Public Law 107-217, August 21, 2002), and the Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667b; Public Law 80-537), as amended.

Refuge Purpose: The official purpose listed in the NWRS national database is to provide its "… particular value in carrying out the national migratory bird management program (16 U.S.C. 667b, An Act Authorizing the Transfer of Certain Real Property for Wildlife).

National Wildlife Refuge System Mission: To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Use:
What is the use? Is the use a priority public use?
The use is haying. It is not identified as a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997.

Where would the use be conducted?
Haying would occur within the refuge's 400 acre grassland. This activity would not occur on 135 acres of the refuge comprised of woodland, shrubland, or in administrative areas.

When would the use be conducted?
Haying would occur from mid-July to late-October.

How would the use be conducted?
Haying would be conducted through a program with cooperating farmers via special use permit. Refuge grasslands would be divided into sections and hayed rotationally. Haying frequency and intensity would be controlled to suppress broadleaf plant invasion and develop a mosaic of grassland vegetation.

Why is the use being proposed?
The refuge was established to sustain and enhance habitats for grassland-dependent migratory birds. Grassland birds have declined more consistently and over a wider geographic area than any other

group of North American birds over the last 30 years (Robbins et al. 1986, Askins 1993, Knopf 1995, Askins 1997, Sauer et al. 1997). As a result, most grassland birds appear on lists of rare and declining species (NYSDEC 1997, Pashley et al. 2000, U.S. NABCI Committee 2000, U.S. Fish and Wildlife Service 2002). Moreover, all of these species can be found at the refuge. In fact, Audubon New York has designated the refuge as an Important bird Area because it is one of the most important grassland bird nesting and wintering areas in the State (Wells 1998). However, without active management, refuge grasslands will soon become dominated by purple loosestrife or dense shrubland (Mitchell and Shryer 2000). Consequently, the refuge would no longer provide suitable habitat for grassland-dependent birds.

Haying combined with mowing, is a useful and effective grassland management technique (U.S. Fish and Wildlife Service 1982). Mitchell et al. (2000) states that haying and mowing are economic means of controlling invasion of grasslands by forbs and woody plants. Further, haying is generally a more convenient technique to apply than prescribed fire or grazing. Herkert et al. (1993) recommend rotational haying and mowing as a grassland management alternative with subunits left idle. This strategy may provide a complex of grassland successional stages to meet the respective nesting requirements of a diversity grassland bird species. More specifically, haying and mowing are recommended techniques for managing grasslands used by nesting northern harrier (Berkey et al. 1993, Dechant et al. 2001a), upland sandpiper (Kirsch and Higgins 1976, Dechant et al. 2001b), short-eared owl (Tate 1992, Dechant et al. 2001c), horned lark (Dinkins et al. 2001), grasshopper sparrow (Dechant et al. 2001d, Vickery 1996), Henslow's sparrow (Smith 1992, Herkert 2001), vesper sparrow (Camp and Best 1993, Dechant et al. 2001e), savannah sparrow (Swanson 2001), bobolink (Bollinger and Gavin 1992, Dechant et al. 2001e), and eastern meadowlark (Lanyon 1995, Hull 2000).

Availability of Resources: A haying program will create minor staff costs from biological monitoring, law enforcement, and administration. No additional equipment, facilities, or improvements will be required from the Service. Cooperators will be required to use their own equipment. A permit fee may be required. The amount of this fee would be based on level of demand from cooperators. Of the costs listed below, which reflect our current total operations costs associated with managing the refuge, approximately 10% would be dedicated to managing a haying program.

Staff costs	$10,250	0.25 GS 09 FTE
Vehicle fuel	$175	($1.40/gal) (2.5 gal/trip) (50 trips)
Equipment, facility use/replacement	$1,000	vehicles, mowers, hand tools
TOTAL	$11,425	

Anticipated Impacts of Proposed Actions: A managed haying program would have positive impacts to the refuge's grassland habitat and wildlife. Haying suppresses invasion of grasslands by perennial forbs and shrubs. Consequently, grass-dominated plant communities are maintained. Further, rotational haying will help to develop a mosaic of grassland vegetation. Diverse grasslands provide habitat for a greater diversity and abundance of grassland birds.

Public Review and Comment: This draft compatibility determination will be made available for a 45-day public review and comment period in conjunction with release of the draft Comprehensive Conservation Plan/ Environmental Assessment for Shawangunk Grasslands Refuge. It is part of Appendix B – Compatibility Determinations in that document.

Determination:

_____**Use is Not Compatible**
__X__**Use is Compatible With the Following Stipulations**

Stipulations Necessary to Ensure Compatibility: Bollinger et al. (1990) estimated a 40% nest mortality rate in bobolinks in central New York hayfields due to mowing and subsequent field operations. Haying or mowing should be avoided during the early nesting season to avoid destruction to the nests, eggs, and young of breeding grassland birds, including northern harrier (Berkey et al. 1993, Dechant et al. 2001a), upland sandpiper (Lokemoen and Beiser 1997, Dechant et al. 2001b), short-eared owl (Tate 1992), grasshopper sparrow (Dechant et al. 2001d, Vickery 1996), Henslow's sparrow (Smith 1992, Herkert 2001), vesper sparrow (Bryan and Best 1994, Dechant et al. 2001e), savannah sparrow (Dale et al. 1997, Swanson 2001), bobolink (Bollinger and Gavin 1992, Dechant et al. 2001e), and eastern meadowlark (Granfors et al. 1996, Hull 2000). Most grassland birds have fledged young by mid-July in New York (Andrle and Carroll 1988).

Justification: A haying program will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes of Shawangunk Grasslands Refuge. Haying will contribute to the purposes of the refuge by maintaining and enhancing the habitat for grassland-dependent migratory birds and wintering raptors for which the refuge was established. Therefore, it is the determination of the Service that haying is a compatible use of the refuge.

Signature: **Refuge Manager:** _____ 6/13/06
(Signature and Date)

Concurrence: **Regional Chief:** _____ 6/13/06
(Signature and Date)

Mandatory 10-year Re-evaluation Date: June 13, 2016

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COMPATIBILITY DETERMINATION

Use: Wildlife Observation, Nature Photography, Environmental Education, and Interpretation

Refuge Name: Shawangunk Grasslands National Wildlife Refuge

Establishing and Acquisition Authority: Shawangunk Grasslands National Wildlife Refuge (NWR) was established with a no-cost transfer of the Galeville Army Training Site from the Department of the Army in July 1999. This transfer was authorized under the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471 et seq. repealed by Public Law 107-217, August 21, 2002), and the Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667b; Public Law 80-537), as amended.

Refuge Purpose: The official purpose listed in the NWRS national database is to provide its "… particular value in carrying out the national migratory bird management program (16 U.S.C. 667b, An Act Authorizing the Transfer of Certain Real Property for Wildlife).

National Wildlife Refuge System Mission: To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Use:
What is the use? Is the use a priority public use?
The uses are wildlife observation, nature photography, environmental education, and interpretation. They are priority public uses of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997.

Where would the use be conducted?
All uses would be allowed only on designated refuge trails.

When would the use be conducted?
All uses would be allowed only when the refuge is open to the public from 1 hour before official sunrise to 1 hour after official sunset.

How would the use be conducted?
Currently, the refuge is open to the public for wildlife observation, photography, environmental education, and interpretation. Existing facilities to support these activities include a small parking lot and an informational kiosk. Additionally, the closed runways and taxiways of the former Galeville Army Training Site serve as the refuge's trail system. Foot, snowshoe, or cross-country ski access is allowed only on refuge trails from sunrise to sunset. No pets, jogging, horseback riding, bicycling, or motorized vehicles are allowed.

The Service's preferred alternative in the refuge's draft Comprehensive Conservation Plan would enhance the infrastructure and programs to increase wildlife observation, photography, environmental education, and interpretation opportunities at the refuge. The current trail system will be expanded to a two-mile loop trail. New sections of trail will be constructed through wooded areas and along the grassland perimeter. The trail will be supplemented with an observation platform, photography blind and interpretive signs. The refuge trail may be connected to a nature trail proposed on the adjacent Galeville Town Park. Facilities development will also include expansion of the existing parking area and establishment of a visitor contact facility. Enhanced public use programs will include staff or volunteer guided nature walks, teacher workshops, and outdoor classroom programs.

Why is the use being proposed?
Providing opportunities for visitors to engage in wildlife observation, photography, environmental education, and interpretation will promote stewardship of our natural resources and increase public appreciation and support for the refuge.

Availability of Resources: Estimates derived from the Service's Region 5 *Construction and Rehabilitation Cost Estimating Guide* in part.

Parking area expansion	$16,500	increase from 10 space to 20 space lot; gravel; ($1,400/space) (10 spaces) = $14,000; round-rail fence barrier = ($25/LN) (100 LN) = $2500
Trail expansion	$54,000	1 mile foot trail
Blind		$13,500 1 blind
Platform	$27,000	1 platform
Interpretive signs	$15,000	5 signs
Staff costs	$20,500	law enforcement, biological monitoring, administration, maintenance, programs; 0.5 GS 09 FTE
Vehicle fuel	$ 700	($1.40/gal) (2.5 gal/trip) (200 trips) = $700
Equipment use/replacement	$ 5,000	vehicles, mowers, hand tools
	TOTAL $152,200	

Anticipated Impacts of Proposed Actions: Wildlife observation, photography, environmental education, and interpretation activities on refuge trails will have minimal impacts upon the refuge's wildlife. These impacts will most likely be limited, short term disturbances to wildlife immediately adjacent to trails during the activity. This level of disturbance should not decrease wildlife abundance or inhibit the ability of wildlife to nest, rest, or feed at the refuge.

Opening a portion of the Shawangunk Grasslands National Wildlife Refuge may cause disturbance to avian species. Some research suggests human intrusion in wildlife habitats, such as walking on trails, can cause disturbance to wildlife. One example of this is a study done in 1997 (Gutzwiller, et. al, 1997) that showed human intrusion influences avian singing behavior in some species. During breeding season, the seasonal timing of male song affects the timing of territory establishments, male attraction, pair formation, egg laying and transmission of information about breeding songs to young (Gutzwiller, et. al, 1997). Therefore, if human

intrusion affects singing, it could ultimately affect reproduction and survival of some species. Another study conducted in 1996 (Riffell et. al) suggests that when repeated human intrusion recurs over an extended period of time, impacts on avian reproductive fitness have the potential to accumulate temporally at the individual, population and community levels.

Public Review and Comment: This draft compatibility determination will be made available for a 45-day public review and comment period in conjunction with release of the draft Comprehensive Conservation Plan/ Environmental Assessment for Shawangunk Grasslands Refuge. It is part of Appendix B – Compatibility Determinations in that document.

Determination:

_____ **Use is Not Compatible**
__X__ **Use is Compatible With the Following Stipulations**

Stipulations Necessary to Ensure Compatibility: Location of the expanded trail, kiosks, platform, and blind will be planned to minimize disturbance to wildlife. Refuge visitors will only be allowed to participate in these activities on designated trails from sunrise to sunset. Trespass off refuge trails for these uses will not be permitted.

Justification: The National Wildlife Refuge System Improvement Act of 1997 identifies wildlife observation, photography, environmental education, and interpretation, as priority public uses. Priority public uses are to receive enhanced consideration when developing goals and objectives for refuges if they are determined to be compatible. These activities can be conducted without inhibiting the Service's ability to sustain and enhance habitats for grassland-dependent migratory birds and wintering raptors on the refuge. Further, providing opportunities for visitors to engage in wildlife observation, photography, environmental education, and interpretation will promote public appreciation and support for the refuge. These activities will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of Shawangunk Grasslands Refuge.

Signature: **Refuge Manager:** 6/13/06
(Signature and Date)

Concurrence: **Regional Chief:** June 13, 2006
(Signature and Date)

Mandatory 15-year Re-evaluation Date: June 13, 2021

COMPATIBILITY DETERMINATION

Use: Grazing

Refuge Name: Shawangunk Grasslands National Wildlife Refuge

Establishing and Acquisition Authority: Shawangunk Grasslands National Wildlife Refuge (NWR) was established with a no-cost transfer of the Galeville Army Training Site from the Department of the Army in July 1999. This transfer was authorized under the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471et seq. repealed by Public Law 107-217, August 21, 2002), and the Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667b; Public Law 80-537), as amended.

Refuge Purpose: The official purpose listed in the NWRS national database is to provide its "… particular value in carrying out the national migratory bird management program (16 U.S.C. 667b, An Act Authorizing the Transfer of Certain Real Property for Wildlife).

National Wildlife Refuge System Mission: To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Use:
What is the use?Is the use a priority public use?
The use is grazing. It is not identified as a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997.

Where would the use be conducted?
Grazing would occur within the refuge's 400 acre grassland habitat. This activity would not occur on 135 acres of the refuge comprised of woodland, shrubland, or in administrative areas.

When would the use be conducted?
Grazing would occur from early July to mid-October.

How would the use be conducted?
Grazing would be conducted through a program with cooperating livestock owners via special use permit. Refuge grasslands would be divided into sections and grazed rotationally. Grazing frequency and intensity would be controlled to suppress broadleaf plant invasion and produce heterogeneous vegetative structure.

Why is the use being proposed?
The refuge was established to sustain and enhance habitats for grassland-dependent migratory birds. Grassland birds have declined more consistently and over a wider geographic area than any other

group of North American birds over the last 30 years (Robbins et al. 1986, Askins 1993, Knopf 1995, Askins 1997, Sauer et al. 1997). As a result, most grassland birds appear on lists of rare and declining species (NYSDEC 1997, Pashley et al. 2000, U.S. NABCI Committee 2000, U.S. Fish and Wildlife Service 2002). Moreover, all of these species can be found at the refuge. In fact, Audubon New York has designated the refuge as an Important bird Area because it is one of the most important grassland bird nesting and wintering areas in the State (Wells 1998). However, without active management, refuge grasslands will soon become dominated by purple loosestrife or dense shrubland (Mitchell and Shryer 2000). Consequently, the refuge would no longer provide suitable habitat for grassland-dependent birds.

With proper timing, stocking rate, and frequency, grazing can be used to achieve wildlife objectives (U.S. Fish and Wildlife Service 1982). Mitchell et al. (2000) describe several benefits of grazing for managing habitat for breeding grassland birds. These benefits include reduced thatch accumulation, increased structural complexity, and suppressed plant succession. Smith (1997), states that grazing is a cost-effective means of suppressing plant succession, which benefits grassland birds. Herkert et al. (1993) recommend rotational grazing as a means to provide a structural mosaic of grasslands to meet the respective nesting requirements of each grassland bird species.

Light to moderate grazing is beneficial to several grassland birds (Bollinger 1991, Jones and Vickery 1997), particularly those that prefer to nest in fields with short, sparse to intermediate height and density vegetation (Mitchell et al. 2000). These species include upland sandpiper, grasshopper sparrow, savannah sparrow, eastern meadowlark, and bobolink (Herkert et al. 1993). Kirsch and Higgins (1976) indicate that periodic light grazing may be desirable for the long-term maintenance of suitable upland sandpiper habitat and to maintain the best ecological condition of grasslands. Dechant et al. (2001a) recommend moderate rotational grazing as a means of providing optimal nesting habitat for upland sandpipers. Vickery (1996) states that light to moderate grazing is beneficial to grasshopper sparrows in the Northeast. In central New York Smith and Smith (1990) found Henslow's sparrow and grasshopper sparrow nesting in lightly and moderately grazed pastures respectively. Light to moderate grazing is recommended as a management technique for grasslands used by nesting short-eared owl (Dechant et al. 2001b) and bobolink (Dechant et al. 2001c). Swanson (2001) recommends light grazing as a technique to create medium height and density vegetation preferred by nesting savannah sparrows.

Intensive grazing may benefit grassland birds that nest in fields with the shortest, sparsest vegetation, including horned lark and vesper sparrow (Skinner et al. 1984, Herkert 1991, Herkert et al. 1993). Wakeley (1978), Baker and Brooks (1981), and Bechard (1982) demonstrated that tall, dense vegetation impedes the ability of several species of *Buteo* hawks to capture prey. Thus, higher stocking rates may also benefit wintering raptors by increasing availability of rodent prey.

Availability of Resources: A grazing program will create minor staff costs from biological monitoring, law enforcement, and administration. No additional equipment, facilities, or improvements will be required from the Service. Cooperators will be required to provide, install, and remove temporary fencing and transport livestock. A permit fee will be required. The amount of this fee will be based on level of demand from cooperators. Of the costs listed below, which reflect

our current total operations costs associated with managing the refuge, approximately 5% would be dedicated to managing a grazing program.

Staff costs	$10,250	0.25 GS 09 FTE
Vehicle fuel	$175	($1.40/gal) (2.5 gal/trip) (50 trips)
Equipment, facility use/replacement	$1,000	vehicles, mowers, hand tools
TOTAL	$11,425	

Anticipated Impacts of Proposed Actions: A managed grazing program would have positive impacts to the refuge's grassland habitat and wildlife. Grazing suppresses invasion of grasslands by perennial forbs and shrubs. Consequently, grass-dominated plant communities are maintained and controlled grazing yields greater vegetative structure complexity. Structurally heterogeneous grasslands provide habitat for a greater diversity and abundance of grassland birds.

Public Review and Comment: This draft compatibility determination will be made available for a 45-day public review and comment period in conjunction with release of the draft Comprehensive Conservation Plan/Environmental Assessment for Shawangunk Grasslands Refuge. It is part of Appendix B – Compatibility Determinations in that document.

Determination:

_____ Use is not Compatible
___X__Use is Compatible with the Following Stipulations

Stipulations Necessary to Ensure Compatibility: Nest trampling may be an important consideration when choosing grazing as a management tool for refuge grasslands. Smith (1992) mentions this potential threat to Henslow's sparrows breeding in areas grazed by cattle. Livestock trampling has damaged upland sandpiper nests (Ailes 1980). To prevent this damage grazing activities will not be initiated on the refuge until most grassland birds have fledged young. This period begins in early July in New York (Andrle and Carroll 1988).

Intensive grazing throughout the refuge would yield vegetation too denuded to provide habitat for grassland birds that nest in tall, dense vegetation, including northern harrier, short-eared owl (Duebbert and Lokemoen 1977), and Henslow's sparrow (Smith 1992). This grazing regime would also be detrimental to wintering short-eared owls and northern harriers at the refuge which rely on thick, herbaceous vegetation to roost (Kahl and Holcomb, U.S. Fish and Wildlife Service 2003, personal observation). High stocking rates would similarly affect grassland birds that nest in intermediate height and density vegetation, including upland sandpiper, grasshopper sparrow, savannah sparrow, eastern meadowlark, and bobolink. Grassland areas would be managed as a complex and grazed rotationally to provide heterogeneous grassland structure. This strategy would maximize the potential to provide habitat for the greatest diversity and abundance of grassland bird species.

Justification: A grazing program will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes of Shawangunk Grasslands Refuge. Grazing will contribute to the purposes of the refuge by maintaining and enhancing the habitat for grassland-dependent migratory birds and wintering raptors for which the refuge was established. Therefore, it is the determination of the Service that grazing is a compatible use of the refuge.

Signature: **Refuge Manager:** _____ 6/13/06
(Signature and Date)

Concurrence: **Regional Chief:** _____ June 13, 2006
(Signature and Date)

Mandatory 10-year Re-evaluation Date: June 13, 2016

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COMPATIBILITY DETERMINATION

Use: Archery Deer Hunting

Refuge Name: Shawangunk Grasslands National Wildlife Refuge

Establishing and Acquisition Authority: Shawangunk Grasslands National Wildlife Refuge (NWR) was established with a no-cost transfer of the Galeville Army Training Site from the Department of the Army in July 1999. This transfer was authorized under the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471et seq. repealed by Public Law 107-217, August 21, 2002), and the Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667b; Public Law 80-537), as amended.

Refuge Purpose: The official purpose listed in the NWRS national database is to provide its "… particular value in carrying out the national migratory bird management program (16 U.S.C. 667b, An Act Authorizing the Transfer of Certain Real Property for Wildlife).

National Wildlife Refuge System Mission: To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Use:
What is the use?Is the use a priority public use?
The use is hunting. It is a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997.

Where would the use be conducted?
Hunting would be allowed on the entire refuge, but is expected to primarily occur from tree stands on 136 acres of woodland on the refuge. Specifically, this area includes the wooded and brush-dominated west and north sides of the refuge. The refuge's 400 acre grassland is not expected to be desirable to archery hunters, who prefer to work from tree stands. However, hunters may retrieve deer from this grassland area. Hunting will not be allowed in safety zones. These zones will be established around the parking area, near private residences, and the Town Park that are adjacent to the refuge.

When would the use be conducted?
Hunting will coincide with the State's Southern Zone early archery season, generally from mid-October to mid-November. Specific stipulations, including when hunters will be allowed on the refuge during the season, will be developed in a separate Refuge Hunt Plan.

How would the use be conducted?
All hunting will comply with State and Federal regulations. Further, hunters will be required to obtain a refuge permit from the Wallkill River Refuge Headquarters. There will be a fee for the permit consistent with the fee charged for hunting at Wallkill River Refuge (currently $10/permit). The number of permitted hunters will be restricted to ensure safety and minimize impacts to grassland birds, wintering birds of prey, and other priority public uses. Based on our best professional judgment we predict between 15 and 50 hunters per season and estimate 43 hunting days per year. Hunters will be required to report harvest data. Specific hunting regulations and procedures will be described in the Hunt Plan. The refuge hunt program will be reviewed annually to ensure deer management goals are achieved and that the program is providing a safe, high quality hunting experience for participants.

Why is the use being proposed?
Implementing a hunting program will help achieve the biological objective of reducing the density of the refuge's whitetail deer population. An overabundance of deer yields intensive browsing which has direct negative impacts to plant communities. In particular, the structural complexity of the forest understory and shrub-dominated areas is significantly decreased. Over-browsing also yields vegetation monotypes composed only of the plants that are unpalatable to deer. In fact, deer over-browsing may threaten several rare plants at the refuge, including Frank's sedge (*Carex frankii*) which is a State-listed endangered species. Over-browsing also causes indirect impacts to refuge fauna. The decrease of species and structural diversity in refuge plant communities yields degraded habitat for a wide diversity refuge wildlife. Further, providing an opportunity to hunt at the refuge promotes stewardship of our natural resources and increase public appreciation and support for the refuge.

Availability of Resources: An archery deer hunting program will require development of informational materials. Staff time for law enforcement, biological monitoring, and administration will also be necessary. A permit fee would be implemented to offset costs. The fee will be consistent with what is charged at Wallkill River Refuge.

Staff costs	$ 9,737	0.20 GS 09 FTE (set-up, outreach, monitoring)
Informational materials	$ 1,000	signs, brochures, maps
Vehicle fuel	$ 87	($1.40/gal) (2.5 gal/trip) (25 trips)
Equipment and facility use and Replacement	$ 500	vehicles
TOTAL	$11,324	

Anticipated Impacts of Proposed Actions: The impacts of allowing hunting may include disturbance of non-target species in the course of tracking prey, trampling of vegetation, possible creation of unauthorized trails by hunters, littering and possible vandalism and subsequent erosion.

Many landowners suffer landscape damage due to deer on a regular basis, transmission of Lyme disease becomes a significant issue with large numbers of deer, starvation is a possibility when deer numbers are high as food supplies dwindle in bad weather and deer-vehicle collisions become more common and problematic.

Archery deer hunting will cause inconsequential disturbance to wildlife not targeted for removal. Moreover, we expect a beneficial overall impact to the plants and wildlife of the refuge.

Public Review and Comment: This draft compatibility determination will be made available for a 45-day public review and comment period in conjunction with release of the draft Comprehensive Conservation Plan/ Environmental Assessment for Shawangunk Grasslands Refuge. It is part of Appendix B – Compatibility Determinations in that document.

Determination:

_____**Use is Not Compatible**
__X__**Use is Compatible With the Following Stipulations**

Stipulations Necessary to Ensure Compatibility: Hunters will be allowed to install temporary blinds in the forested areas of the refuge. We will assess after the program has been implemented at least 2 years, whether to allow temporary blinds in the Refuge grasslands. The concern with placement in the grasslands is the potential to disturb grassland birds and wintering birds of prey. Firearms hunting and deer drives will not be permitted. Hunters must comply with all State and Federal regulations and possess a refuge permit. Hunters will be required to report harvest data.

Justification: The National Wildlife Refuge System Improvement Act of 1997 identifies hunting as a priority public use. Priority public uses are to receive enhanced consideration when developing goals and objectives for refuges if they are determined to be compatible. This use can be conducted without inhibiting the Service's ability to sustain and enhance habitats for grassland-dependent migratory birds and wintering raptors on the refuge. Further, providing hunting opportunities will promote public appreciation and support for the refuge. This activity will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of Shawangunk Grasslands Refuge.

Signature: **Refuge Manager:** _____ 6/13/06
(Signature and Date)

Concurrence: **Regional Chief:** _____ June 13, 2006
(Signature and Date)

Mandatory 15-year Re-evaluation Date: June 13, 2021

COMPATIBILITY DETERMINATION

Use: Research conducted by non-Service personnel

Refuge Name: Shawangunk Grasslands National Wildlife Refuge

Establishing and Acquisition Authority: Shawangunk Grasslands National Wildlife Refuge (NWR) was established with a no-cost transfer of the Galeville Army Training Site from the Department of the Army in July 1999. This transfer was authorized under the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471et seq. repealed by Public Law 107-217, August 21, 2002), and the Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667b; Public Law 80-537), as amended.

Refuge Purpose: The official purpose listed in the NWRS national database is to provide its "… particular value in carrying out the national migratory bird management program (16 U.S.C. 667b, An Act Authorizing the Transfer of Certain Real Property for Wildlife).

National Wildlife Refuge System Mission: To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Use:
What is the use?Is the use a priority public use?
The use is research conducted by non-Service personnel. It is not identified as a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended by the National Wildlife Refuge System Improvement Act of 1997.This use is not a priority public use of the Refuge System.

Where would the use be conducted?
The location of the research will vary depending on the individual research project that is being conducted. The entire refuge is open and available for scientific research. An individual research project is usually limited to a particular habitat type, plant or wildlife species. On occasion research projects will encompass an assemblage of habitat types, plants or wildlife. The research location will be limited to those areas of the refuge that are absolutely necessary to conduct of the research project.

When would the use be conducted?
The timing of the research will depend entirely on the individual research project's approved design. Scientific research would be allowed to occur on the refuge throughout the year. An individual research project could be short term in design, requiring one or two visits over the course of a few days. Other research projects could be multiple year studies that require daily visits to the study site. The timing of each individual research project will be limited to the minimum required to complete

the project. If a research project occurs during the refuge hunting season, special precautions will be required and enforced to ensure public health and safety.

How would the use be conducted?
The methods of the research will depend entirely on the individual research project that is conducted. The methods of each research project will be scrutinized well before it will be allowed to occur on the refuge. No research project will be allowed to occur if it does not have an approved scientific method, negatively impacts grassland birds and wintering raptors, or compromises public health and safety.

Why is the use being proposed?
Research by non-Service personnel is conducted by colleges, universities, Federal, State, and local agencies, non-governmental organizations, and qualified members of the general public. This research would further the understanding of the natural environment and could be applied to management of the refuge's wildlife.

Availability of Resources: Shawangunk Grasslands Refuge is an unstaffed satellite refuge administered by Wallkill River NWR. No additional equipment, facilities, or improvements will be necessary to allow research by non-Service personnel. Staff time would be required to review research proposals and oversee permitted projects. We expect that conducting these activities will require less than one-tenth of a work-year for one staff member (0.1 FTE Wildlife Biologist GS 9 = $4,093).

Anticipated Impacts of Proposed Actions: The Service encourages approved research to further the understanding of the natural resources. Research by other than Service personnel adds greatly to the information base for Refuge Managers to make proper decisions. Disturbance to wildlife and vegetation by researchers could occur through observation, mist-netting, banding, and accessing the study area by foot or vehicle. It is possible that direct mortality could result as a by-product of research activities. Mist-netting for example, can cause stress, especially when birds are captured, banded and weighed. There have been occasional mortalities to these birds, namely when predators such as raccoons and cats reach the netted birds before researchers do.

Minimal impact will occur when research projects which are previously approved are carried out according to the stipulations stated in the Special Use Permit issued for each project. Overall, however, allowing well designed and properly reviewed research to be conducted by non-Service personnel is likely to have very little impact on refuge wildlife populations. If the research project is conducted with professionalism and integrity, potential adverse impacts are likely to be outweighed by the knowledge gained about an entire species, habitat or public use.

Allowing research to be conducted by non-Service personnel would have very little impact on Service interests. If the research project is conducted with professionalism and integrity, potential adverse impacts can far outweigh the data and knowledge gained.

Public Review and Comment: This draft compatibility determination will be made available for a 45-day public review and comment period in conjunction with release of the draft Comprehensive Conservation Plan/Environmental Assessment for Shawangunk Grasslands Refuge. It is part of Appendix B – Compatibility Determinations in that document.

Determination:

_____**Use is Not Compatible**
__X__**Use is Compatible With the Following Stipulations**

Stipulations Necessary to Ensure Compatibility: All researchers will be required to submit a detailed research proposal following Service Policy (FWS Refuge Manual Chapter 4 Section 6). The refuge must be given at least 45 days to review proposals before initiation of research. If collection of wildlife is involved, the refuge must be given 60 days to review the proposal. Proposals will be prioritized and approved based on need, benefit, compatibility, and funding required. Special Use Permits (SUP) will be issued for all research conducted by non-Service personnel. The SUP will list all conditions necessary to ensure compatibility. The SUP will also identify a schedule for annual progress reports and submission of a final report or scientific paper. Refuge staff would consult with Regional refuge biologists, other Service Divisions, and State agencies on research proposals. All researchers will be required to obtain appropriate State and Federal permits.

Any research project may be terminated at any time for non-compliance with the SUP conditions, or modified, redesigned, relocated or terminated, upon a determination by the refuge manager that the project is causing unanticipated adverse impacts to wildlife, wildlife habitat, approved priority public uses, or other refuge management activities.

Justification: The Service encourages and supports research and management on refuges. This research provides scientific data upon which decisions regarding management of the refuge may be based. Approved research conducted by non-Service personnel will not materially interfere with or detract from the mission of the National Wildlife Refuge System or the purposes for which the Refuge was established.

Signature: **Refuge Manager:** _____ 6/13/06
(Signature and Date)

Concurrence: **Regional Chief:** _____ June 13, 2006
(Signature and Date)

Mandatory 10-year Re-evaluation Date: June 13, 2016

COMPATIBILITY DETERMINATION

Use: Model airplane flying and model airplane competitive events.

Refuge Name: Shawangunk Grasslands National Wildlife Refuge

Establishing and Acquisition Authority: 16 U.S.C. Section 667b (An Act Authorizing the Transfer of Certain Real Property for Wildlife)

Refuge Purpose: To carry out the national migratory bird management program.

National Wildlife Refuge System Mission: To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Use: This activity is the conduct of free flight and radio-controlled model airplane flying and competitive events.

Model airplane flying was permitted for 26 years at the former Galeville Army Training Facility in Ulster County prior to the acquisition of the site. This use was suspended by the West Point Military Academy in 1995. In July 1999, 566 acres were transferred to the U.S. Fish and Wildlife Service (Service) for the protection and management of migratory bird habitat, with a special emphasis on grassland dependant birds. The site is now known as the Shawangunk Grasslands National Wildlife Refuge (Refuge).

Representatives from the East Coast Free Flight Conference and other model airplane organizations, such as the Academy of Model Aeronautics, began asking for permission to recommence model airplane flying and competitions as early as 1995. Congressman Benjamin Gilman (R-NY) has asked the Service to allow model airplane flying and competitions at the Refuge.

Use of the Refuge would range from a single individual to groups of people engaging in free flight or radio-controlled model airplane flying during daylight hours, probably for a period of several hours. Model airplane use would primarily occur from April through November, but would also be possible through the rest of the year, depending upon the weather. The size of the groups is unknown and accounts vary, but groups of six to twelve people engaging in recreational flying or practicing for competition would not be unlikely. Most of the group flying would likely occur on the weekends. Historically, six to seven two-day events were organized each year at the facility, including special competitions that would attract 300 people. Continuation of these events, which include qualifications for International Competition Classes, is one of the major reasons why the interest in model airplane flying at this Refuge has not abated. Given the size of the Refuge, model airplane flying would occur throughout the entire Refuge.

The launching of free flight and radio-controlled model airplanes would generally take place on the existing runways, which are now used by the public for wildlife observation, nature photography, and environmental education. Depending on the speed and direction of the wind, modelers generally move to the furthest upwind area in the boundary of the flying site, as this gives the model more room to drift downwind. Some free flight planes, known as gliders, are towed to their initial starting altitude on a line as long as 50 meters. Modelers tow the plane to the location with the best air (a thermal). Modelers launched planes from the fields as well as the runways, particularly during competitions, in order to gain maximum time aloft.

Once launched, free flight planes cannot be controlled by the modeler. Thus, frequent retrieval of the planes in the grasslands and surrounding forests is expected. Radio-controlled planes are more likely to stay under the control of the modeler and will generally be able to return to the launch site. However, both types of models will crash, and retrieval may occur anywhere on the Refuge. Motorized vehicles and bicycles have been used in the past to retrieve models.

Models would fly over Refuge grasslands that are being managed for breeding and wintering grassland birds. These grasslands and the associated woodlands are also heavily used by migratory birds in the spring and fall.

Additional use of the area would require parking for upwards of 125 vehicles, including motor homes, during competitive events. Currently, the only place to park vehicles is on the runways. Competitions also draw family members and other spectators. Consequently, other incidental uses that would likely occur that have detrimental impacts to wildlife and habitat include picnicking, littering, and trespass.

Anticipated Impacts of the Use: The primary management objective of this Refuge is to provide large expanses of undisturbed grasslands so that birds may nest, incubate their eggs, rear their young, rest, and feed. Disturbance in winter is minimized to increase the survival of raptors and other species during periods of scarce food resources. Current public use activities are designed to minimize impacts. Only foot traffic is allowed on existing paved or concrete surfaces and visitors are prohibited from entering the grasslands.

The National Audubon Society of New York State has identified this site as an “Important Bird Area”, a designation given only to places that support a significant abundance and diversity of birds (Wells 1998). In particular, the Refuge is among a dwindling number of sites in New York State and one of only two sites in the Hudson Valley large enough to support the entire assemblage of grassland birds (New York State Department of Environmental Conservation and Office of Parks, Recreation and Historic Preservation 2001). Grassland dependant birds have declined more consistently and over a wider geographic area than any other group of North American birds over the last 30 years (Robbins et al. 1986, Askins 1993, Knopf 1995, Askins 1997, Sauer et al. 1997). Grassland birds nest, roost, and forage on the ground and are especially susceptible to human disturbance.

Several grassland birds that use the Refuge are on lists of rare or declining species, including northern harrier, upland sandpiper, short-eared owl, horned lark, bobolink, grasshopper sparrow, Henslow's sparrow, and vesper sparrow. The Service Northeast Region list of Birds of Conservation Concern (draft) includes upland sandpiper, short-eared owl, and Henslow's sparrow. Partners In Flight (PIF) lists upland sandpiper, Henslow's sparrow, and bobolink as high conservation priority species in the Northern Ridge and Valley physiographic region in which the Refuge lies (Pashley et al. 2000). The North American Bird Conservation Initiative (NABCI) ranks Henslow's sparrow as a priority species in the Appalachian Mountain Bird Conservation Region (U.S. NABCI Committee 2000). The New York State Department of Environmental Conservation (1997) lists short-eared owl as an endangered species, northern harrier, upland sandpiper, and Henslow's sparrow as threatened species, and horned lark, grasshopper sparrow, and vesper sparrow as species of special concern.

The Refuge is one of the most important grassland bird nesting and wintering areas in the state (Wells 1998). Grassland dependant birds that nest at the Refuge include northern harrier, upland sandpiper, grasshopper sparrow, Henslow's sparrow, savannah sparrow, vesper sparrow, eastern meadowlark, and bobolink. Evidence of breeding short-eared owl has been observed, but nesting has never been confirmed. Grassland birds that find valuable wintering habitat at the Refuge include northern harrier, short-eared owl, and horned lark. According to Wells (1998) up to 16 short-eared owls and six northern harriers have been observed at the Refuge in winter, as well as flocks of 60 to 80 horned larks. However, Refuge winter raptor surveys frequently document 12 to 17 northern harriers (U.S. Fish and Wildlife Service 2002, unpubl. data) and Alfred Ott (2002) of the Queens County Bird Club reports a maximum of 35 northern harriers.

The Refuge also provides important habitat for migrant grassland birds in spring and fall. Northern harriers migrating along the Shawangunk Mountains often stop at the Refuge to rest and forage. Migrant short-eared owls arrive at the Refuge in early November and depart in late April. Flocks of up to100 bobolinks gather at the Refuge in August and September and flocks of up to 50 eastern meadowlarks are found at the Refuge in April, October, and November. Up to 19 vesper sparrows have been counted at the Refuge in October (Kahl 2001, U.S. Fish and Wildlife Service, pers. obs).

The Refuge offers sanctuary to several other birds that are on lists of rare or declining species. Loggerhead shrikes (state endangered) use the extensive grassland habitat during both southbound and northbound flights. Large flocks of common nighthawks (state special concern) forage over the Refuge and use the runways as daytime roosting areas before continuing their flights. Sharp-shinned hawks, Cooper's hawks, northern goshawks, and red-shouldered hawks (state special concern) rest and forage at the Refuge in winter, spring, and fall. Peregrine falcon (state threatened) has been seen at the Refuge during fall migration. Other birds that nest at the Refuge or stop during migration that are on the Service list of Birds of Conservation Concern, PIF list of high conservation priority species, and NABCI priority species list include; black-billed cuckoo, red-headed woodpecker, yellow-bellied sapsucker, black-capped chickadee, wood thrush, prairie warbler, bay-breasted warbler, and Canada warbler.

Fifty-eight bird species nest on the Refuge. These include American kestrel, killdeer, American woodcock, willow flycatcher, eastern kingbird, eastern bluebird, brown thrasher, chestnut-sided warbler, blue-winged warbler, field sparrow, and chipping sparrow. Many of these species nest near the edge of the runways and are especially susceptible to disturbance. Although the Service intends to remove the runways, the area will be re-vegetated with a plant community suited to these birds.

Hudsonia, a non-profit organization affiliated with Bard College, studied this site in 1992 (Stevens). Hudsonia found that, "(i)n spite of its generally disturbed condition, the importance of this site to native biological diversity may exceed that of many more pristine areas of equal or larger size. The design of any development or land use change contemplated for this property should incorporate the preservation of adequate habitat and buffer zones for the rare plant and animal species known to occur there."

Impacts to migratory birds from model airplane flying and competitions are both direct and indirect. These impacts stem both from the act of model airplane flying and its associated activities, such as retrieval of planes. There are no specific studies that describe the impact of model airplane disturbance to grassland birds. However, there has been research showing that response to aircraft is influenced by many variables, including aircraft size, proximity, flight profile, engine noise, and sonic booms (Smith et al. 1988). Piping plovers have been observed to modify their behavior in the presence of kite-flying activities. Loons have been observed to engage in avoidance behavior when small airplanes are near. Gladwin et al. (1987) surveyed Service Endangered Species and Ecological Services Field Offices, National Wildlife Refuges, Hatcheries, and Research Centers to determine the nature and extent of aircraft impacts on fish and wildlife. Small propeller aircraft caused disturbance at 50% of the installations. Bélanger and Bédard (1995) described aircraft overflights as the most important cause of disturbance to migrant snow geese in Quebec. Bélanger and Bédard suggested that aircraft flights should be strictly regulated over snow goose staging areas with flights below 500 meters prohibited. Owens (1977) found that slow, noisy aircraft were most disruptive to brant. In fact, brant flew away in response to aircraft below 500 meters and up to 1.5 kilometers. Owens suggested that the strong response was partly due to the visual resemblance of planes to large predatory birds. Knight and Cole (1995) state that smaller fixed-winged aircraft may be more likely to disturb wildlife because they fly slower and at lower altitudes.

These authors describe the effects of passenger aircraft upon mainly waterfowl. Still, these examples are most relevant because they demonstrate that small, loud planes flown at low altitudes, low speeds, and unpredictable intervals cause the most disturbance to birds. These aircraft are most similar to model airplanes. In fact, model airplanes are a tool used to deter birds from occupying airport runways and flight paths (Transport Canada 1994).

Some airports, if managed properly, do provide important habitat for grassland birds. Examples include Logan Airport and Westover Air Reserve Base in Massachusetts (Jones and Vickery

1997) and Bradley International Airport in Connecticut (Crossman 1989) to name a few. At these sites, however, air traffic is dominated by large planes flown at frequent, predictable intervals that enable wildlife to become habituated. Also, the general public is not allowed to traverse the fields surrounding the runways. Model airplane flying at the Refuge would not have the same characteristics.

Direct impacts from modelers include the destruction of nests or the modification of feeding and nesting behavior during the retrieval of stray models. Modelers prefer to walk in a straight line to the point where the model airplane lands to increase the chance that the model will be successfully retrieved. A model can often be unseen even when a person is only a few feet away. Therefore, modelers will want to walk through grasslands and wetlands that may have nesting, resting, or feeding birds to retrieve their planes. Additionally, individuals will enter grassland areas and disturb wildlife to launch free flight models when winds do not parallel the runways.

Scarlatelli (1996) of Northeast Environmental Management Systems, in a report prepared at the request of the East Coast Free Flight Conference, concluded that model airplane flying would be compatible with efforts to preserve the area's ecological importance. This recommendation is based partly on the deduction that ground nesting birds of concern, including upland sandpiper, short-eared owl, vesper sparrow, savannah sparrow, grasshopper sparrow, Henslow's sparrow, bobolink, and eastern meadowlark, present distraction displays in response to predators near their nests. Hence, the birds would be conspicuous to model airplane enthusiasts traversing fields to retrieve stray airplanes and the nests would be easy to avoid.

This reasoning ignores the fact that individuals walking through grassland areas to retrieve or launch model planes create a direct liability for breeding grassland birds. While adult birds are engaged in attempting to lure a perceived predator from their nests, the eggs and young are exposed to increased risk of nest predation and exposure to adverse temperatures. Lanyon (1995) relates that adult eastern meadowlarks become wary and delay visits back to nests with young after disturbance. Further, predation of eggs, young, and attendant adults can occur as a result of nest predators following scent paths and disturbed vegetation to the nest area. Predation of northern harrier young has occurred when predators followed humans to nests (Watson 1977, Toland 1985). At a minimum, adult birds that are attempting to divert humans from nests, or are simply frightened from nests, are unnecessarily expending energy and time during a critical period in their annual cycle.

Moreover, the conclusion that virtually all the breeding grassland birds of the region display diversionary behaviors near the nest is only partly accurate and misses the point. If the modeler can see that the bird is disturbed, which is not always obvious, then the disturbance has already occurred and the bird has expended energy in nest defense that is best used either incubating or rearing young.

In fact, the behavior of these birds from disturbance varies greatly between species, between individuals within species, and throughout the stages of the nesting cycle. This pattern is well-documented. Townsend (1961) gives the accounts of Saunders (1913), Urner (1921), and Urner

(1923), of "wounded bird" acts of short-eared owls stimulated by humans near nests with young. These accounts sometimes include adult birds stooping or diving at the intruder. Tate (1992) and Clark (1975) also describe elaborate distraction displays, most often used by the male. However, Tate also states that both male and female short-eared owls often vacate the vicinity of the nest while an intruder is present. Thus, this species does not always make its nest location easy to determine and avoid.

Similarly, adult upland sandpipers sometimes feign injury, give alarm calls, and even fly directly at human intruders near fledglings (Coues 1874, Forbush 1912) or nests with eggs (Coues 1874, Bowen 1976). However, this behavior was not observed by Sordahl (1981). Indeed, the former description reflects a significant diversion of resources that should be prevented.

Adult savannah sparrows respond to predators within 10 to 15 meters of the nest by giving alarm calls, fanning tails, raising crests, and making short nervous flights (Wheelwright and Rising 1993), not a conspicuous display to the unpracticed eye. Furthermore, Potter (1974) describes only about 25% of females flushed from nests giving a conspicuous distraction display of scurrying and crouching with quivering wings.

Berger (1968) gives the account of Roberts (1932) of dramatic injury feigning by vesper sparrows flushed from the nest. Contrastingly, Roberts also states that vesper sparrows more commonly fly "directly away, low over the ground." Berger states that female vesper sparrows will respond to humans near nests with young by running along the ground conspicuously, with tail spread and wings raised. Berger further states that the same stimulus near nests with eggs consistently cause the female to fly 50 to 60 yards away without feigning injury or giving alarm notes.

Vickery (1996) states that grasshopper sparrows give a broken-wing distraction display at the nest and probably near fledged young. Smith (1968) states that female grasshopper sparrows flushed from the nest may give a distraction display or may fly 25 to 30 feet away and hide in the grass. Smith also gives Nicholson's (1936) description that some female grasshopper sparrows "will run off the nests before they are found" while others gave conspicuous distraction displays.

Both bobolink sexes perform diversionary displays in response to humans near their nests according to Martin and Gavin (1995). Martin and Gavin further state that, if pursued, these behaviors may proceed until the intruder is more than 100 meters from the nest.

Lanyon (1995) states that male and female eastern meadowlarks may attempt to lure humans from nests through distraction displays of spread wings and tail. Lanyon further states that females may also explode off the nest causing injury to eggs and young. Arbib (1988) noted that bobolink was confirmed in far more New York State Breeding Bird Atlas blocks by observation of distraction displays than eastern meadowlark, although the two species were found in a similar number of blocks.

Response of Henslow's sparrows to human intruders near their nests is not described. However, Smith (1968) characterizes the species as "a shy and retiring inhabitant of open fields and grasslands." Smith further writes of "its custom of skulking or running mouselike through the grass at the approach of an intruder." Eaton (1988a) calls Henslow's sparrow "one of the most inconspicuous land birds in the Northeast."

This variation in response indicates that displays of disturbance may not be sufficient to protect nests from direct impacts associated with the inadvertent trampling of vegetation.

Scarlatelli (1996) also concluded that individuals searching fields for errant model airplanes would not impact ground-nesting birds, including northern harrier, upland sandpiper, short-eared owl, vesper sparrow, savannah sparrow, grasshopper sparrow, Henslow's sparrow, bobolink, and eastern meadowlark, because these species are "well-adapted to minor, temporary disturbances." This conclusion fails to acknowledge that there are significant differences in the sensitivity of ground-nesting birds to disturbance between species, between individuals within species, and through the stages of the nesting cycle.

Upland sandpipers and savannah sparrows seem least disturbed by human presence near the nest. Bowen (1976) states that repeated flushing during nest checks does not cause nest desertion by upland sandpipers. Baird (1968) and Welsh (1975) indicate that breeding savannah sparrows are tolerant of human disturbance near the nest.

In contrast, Northern harriers are sensitive to nest disturbance. Macwhirter (unpubl. data) found that none of 15 northern harrier nests with three or more eggs were abandoned after discovery. However, nine of 20 nests with two or fewer eggs were subsequently abandoned, and only four pairs re-nested within their territory. Simmons (1983) found that harriers rarely deserted nests with young when observation blinds were placed within five to eight meters, but found the opposite when nests contained eggs. Saunders (1986) found that 25% of harrier adults behaved erratically in response to an occupied blind near nests with young. Serrentino (1992) suggests that suitable northern harrier breeding habitat in coastal New England is vacant in part because of heavy use by humans. In fact, volunteers field observers working on the New York State Breeding Bird Atlas project were warned to avoid disturbing the nest of this species (Smith 1988).

Leasure and Holt (1991) state that short-eared owls are generally not sensitive to human activity near the nest. However, they base this on the fact that short-eared owl nests are difficult to find. Further, Holt (1992) found that three of four female short-eared owls abandoned nest scrapes after being flushed by researchers and re-nested nearby. New York State Breeding Bird Atlas volunteers were advised against attempting to locate the nest of this species also (Eaton 1988b). Both this species and northern harrier are also sensitive to winter roost disturbance.

Eastern meadowlarks are particularly sensitive to human disturbance near their nests, especially before hatching. Lanyon (1995) states that a female flushed from the nest during incubation "invariably aborts." Lanyon also states that desertion of nests with young is less likely.

Furthermore, the frequency of disturbance to breeding grassland birds should not be considered temporary or minor. Scarlatelli (2002) gives Jean Pailet's (ex-officer of the Academy of Model Aeronautics and member of the Skyscrapers Club) account of two to 12 individuals using the site on a typical weekend day and competitions rarely attended by more than 100 people. According to Langelius (1998 and 2002, ECFFC, pers. com.), the Galeville Army Training Facility was used daily by modelers. In addition, six to seven two-day events were held annually from May to October, drawing up to 125 modelers and 150 family members per event. Thus, the disturbance to wildlife would be very significant, even if only a fraction of these users walked across the fields to retrieve or launch model airplanes, or used loud, radio-controlled models.

The impact of model retrieval to nesting birds is compounded when modelers use all terrain vehicles (ATVs) or other motorized vehicles to cross through fields. Scarlatelli (2002) states that modelers typically used two-wheeled, powered motor bikes or motor scooters and that a minority used three- or four-wheeled vehicles. Scarlatelli further states that vehicles were primarily used on runways and "established paths" to approach the vicinity of the stray aircraft, but final retrieval was done on foot. Conflictingly, correspondence from Refuge neighbors and bird watchers describe ATVs frequently being driven throughout the grassland interior by modelers, sometimes becoming stuck.

Nor is the level of noise generated by radio-controlled planes a minor disturbance. The noise is high-pitched, irregular, random, and fluctuates with the aeronautic maneuvering of the model. The Radio Control Club of Rochester (AMA Charter 465), New York recommends a 95 decibel (dBA) maximum for radio-controlled planes at nine feet at full power on the ground (Radio Control Club of Rochester 2001). This level exceeds the noise produced by a chainsaw, lawnmower, or air compressor. Under certain atmospheric conditions, this noise can carry more than one mile. In addition, radio-controlled planes with 0.09cc internal combustion engines can produce sound levels up to 115 dBA. The noise generated from radio-controlled model airplane competitions has been described as like "an angry swarm of bees" (Madison Radio Controlled Airplane Society 2001).

Currently, parking for 125 cars would only be possible if the existing runway system in the middle of the Refuge were used. This accommodation would create disturbance from vehicles driving into the grasslands, hydrocarbon pollution from emissions and oil leaks, and litter associated with the parking area. It would also displace visitors on the nature trail, which is currently comprised of the entrance road and runways. Moreover, the Service intends to remove these runways, except for an approximately eight-foot wide strip for the nature trail and administrative access. Consequently, approximately 30 acres of grassland habitat will be restored. Allowing model airplane use would create an incentive to preserve the runways, halt the Service's plan to restore wildlife habitat, and is contrary to the mission of the Refuge and the National Wildlife Refuge System.

The runways are in the least desirable area of the Refuge to accommodate parking, as they are located in the center of the field. Hence, a new parking area would have to be constructed on a

location where the negative impacts to wildlife and visitors will be less. The most likely place would be along the current access road into the Refuge. Although the detrimental effects would be less than parking on the runways, construction of a new 125 car parking lot will create a direct negative impact to wildlife through conversion of natural habitat to pavement.

Individuals crossing grassland areas on foot or with motorized vehicles could also negatively impact the Refuge's flora. Five state-listed rare plant species occur on the Refuge (Stevens 1992). These include small-flowered agrimony (*Agrimonia parviflora*), small white aster (*Aster vimineus*), purple milkweed (*Asclepias purprascens*), Bush's sedge (*Carex bushii*), and Frank's sedge (*Carex frankii*). Identification of these protected species is quite difficult to the untrained eye. Any unnecessary disturbance from people and motorized vehicles traversing areas off designated trails could harm or eliminate the habitat of these plants.

Purple loosestrife (*Lythrum salicaria*) and common reed (*Phragmites australis*) are invasive, exotic plant species that occur on the Refuge and significantly degrade wildlife habitat (Smith 1964, Stuckey 1980, Rawinski and Malecki 1984, Malecki 1987, Thompson et al. 1987, Baldassarre and Bolen 1994). Purple loosestrife has undoubtedly become so well established because of previous degradation of the site, including clearing, filling, road and runway construction. Allowing motorized vehicles to access the grasslands to launch or retrieve models could exacerbate the spread of purple loosestrife and common reed due to soil disturbance.

In an update commissioned by the Academy of Model Aeronautics, Scarlatelli (2002) states that model airplane flyers have pursued their hobby on "conservation lands" with positive outcomes, citing Hambly (1996) of the Massachusetts Division of Fish and Wildlife, Buffington (1989) of the Colorado Division of Parks and Outdoor Recreation, and personal observation at the Hackensak Meadowlands of New Jersey. The Oregon Department of Fish and Wildlife (2002) reported a good relationship with model airplane organizations using lands the agency administers. Additionally, Knetzger (2002) listed several sites in Wisconsin and Illinois that modelers have used, including county parks, village parks, state recreation areas, and state forest preserves. However, all of these examples are from areas administered by agencies that include provision of recreational opportunities as equal or higher in priority than management for wildlife.

Moreover, conflict between model airplane use, wildlife, and outdoor enthusiasts does occur at some locations. Scarlatelli (2002) gives the account of Porutski (1996) of the New Jersey Division of Fish, Game and Wildlife on model airplane use at Assunpink Wildlife Management Area entailing few, minor problems that were easily resolved. However, Porutski further states that:

"the most difficult issue to deal with is the noise associated with this type of activity and its effect on wildlife, sportsmen and the general public. Sportsmen and the general public seek to enjoy the outdoors and wildlife in a quiet and serene environment. Model airplane flying in this type of environment represents a very serious conflict. I would

recommend that this type of activity take place in a park which accommodates a diversity of recreational uses such as picnicking, ball fields and swimming."

Dorosh (2002) of the Brooklyn Bird Club cites model airplane use as one of the contributing factors causing a virtual extirpation of breeding grassland birds at Floyd Bennett Field, New York. Neuendorffer (2001) describes a severe negative impact of model airplane activities at Latadomi Nature Center in Pennsylvania, including trampled vegetation, soil erosion and compaction, excessive noise, and decreased wildlife. The model airplane group no longer uses this site.

Further, 32 local and national organizations submitted comments (Appendix) on the draft Compatibility Determination expressing strong concern over the negative impact of model airplane flying upon grassland birds and the ability of the public to enjoy priority wildlife-dependant uses at the Refuge. Certainly, the ability of a bird watcher to hear bird vocalizations is directly impaired by the noise of radio-controlled planes, motorized vehicles, and crowds at competitive events. Likewise, their ability to observe wildlife is diminished due to the avoidance behavior of wildlife in this environment. Thus, permitting model airplane flying would prevent the Refuge staff from providing a high quality experience for the wildlife-dependant visitor. Additionally, residents near the Refuge have applauded our decision to not issue special use permits for model airplane flying.

Hunting is not currently allowed on the Refuge, but alternatives being considered as part of the Refuge's Comprehensive Conservation Plan open some hunting seasons. Hunting has been established as a priority public use through the National Wildlife Refuge System Improvement Act of 1997. Moreover, hunting will be a vital tool for controlling the Refuge's deer population. This control is critical, for an overabundant deer population has adverse impacts on the Refuge's plant community, and therefore the rest of the Refuge's wildlife. Model airplane activities conducted in the fall would interfere with hunting. However, restrictions will be implemented on hunting seasons and techniques to minimize disturbance to migrant or wintering birds.

Availability of Resources: If allowed, this use would increase maintenance, law enforcement, biological monitoring, and administrative costs. The Refuge currently has a four-car parking lot, which will be expanded in 2002 to accommodate ten cars. Facilities do not exist to accommodate the 125 cars likely associated with competitive events (Langelius, ECFFC, 1998, pers. com.). In the past, modelers parked on the runways. These runways are now accessible by foot only. While a small portion of the runways will be retained for use as a nature trail, the majority of the runways will be removed and the area restored to native grasslands. Therefore, allowing competitive events would require the construction of a 125-car parking lot.

If model airplane flying were allowed, a monitoring program would have to be developed and implemented to determine the impacts of model airplane flying and its associated activities on wildlife and visitors seeking a wildlife-oriented experience. A law enforcement presence would be required for all competitive events and at other times to ensure compliance with stipulations

and Refuge regulations. The issuance of special use permits and the development of stipulations would entail administrative costs.

Anticipated annual costs to allow model airplane flying on an individual basis, through special use permit, are estimated below. These numbers assume that individual modelers use the Refuge four days per week from May through September, and weekends from April through October. This estimation is based on personnel communication (1998 and 2002, Langelius, East Coast Free Flight Conference), Scarlatelli's (2002) figures, and correspondence from individuals who used the site when it was in the ownership of West Point Military Academy. The estimation that individual modelers would use the Refuge 101 days per year is conservative.

Biological monitoring oversight:	$21,008	($26/hour @ 8 hours/day for 101 days)
Law enforcement:	$26,260	($32.5/hour @ 8 hours/day for 101 days)
Administrative:	$ 5,000	($25/hour @ 200 hours, assumes 400 individual permits issued and processed annually; per Ross, ECFFC, 1996, correspondence to Senator D'Amato)
Fuel/Vehicle:	$ 683	($1.30/gallon @ 2.6 gallons/trip for 202 trips)
Equipment Use/Replacement:	$ 5,000	(wear on vehicles)
Total costs:	$57,951	

In order to hold seven competitive events annually (Langelius, 1998, ECFFC, pers. com.), the following additional costs would be necessary:

Parking area development:	$345,000	(costs from Construction and Rehabilitation Cost Estimating Guide, 1999, U.S. Fish and Wildlife Service)
Additional law enforcement:	$3,640	($32.5/hour @ 8 hours/day for 14 days)
Additional biological monitoring:	$2,912	($26/hour @ 8 hours/day for 14 days)
Administrative:	$ 980	($35/hour average cost for 28 hours to develop agreements, issue permits, and process payments)
Total additional costs for competitive events:	$352,532	

The combined expense to the Service to allow model airplane flying and competitive events at the Refuge would be $410,483 the first year that competitive events were allowed, and $65,483 annually thereafter (not adjusted for inflation and cost of living increases in salaries).

Annual user fees of $250 per individual or $5,000 per competitive event could be collected to help offset the costs of administering this program. However, the parking area would need to be constructed prior to the holding of competitive events. Expending $345,000 to build a parking lot to support model airplane competitions, while decreasing migratory bird habitat, increasing impacts to grassland birds, and decreasing or preventing wildlife observation and photography opportunities for priority public users, is not an appropriate or legitimate use of resource dollars.

Public Review and Comment: The draft Compatibility Determination was advertised with a public notice in two daily and one weekly newspaper with wide local distribution. The draft determination was posted on the Refuge web site <http://shawangunk.fws.gov> until the Department of the Interior was disconnected from the Internet on December 5, 2001, due to a court order. Notices of the determination were also posted at the Refuge kiosk, the Shawangunk Town Supervisor's office, and the Wallkill Library. Copies of the draft Compatibility Determination were mailed to stakeholders, Congressman Benjamin A. Gilman, and Congressman Maurice D. Hinchey. The draft determination was available for public review for 75 days.

A total of 2,343 written comments were received. Of these, 222 were in favor of the Service position and 2,121 were opposed. Approximately 1,650 comments received were form letters expressing dissatisfaction with the content of the draft determination and requesting reconsideration of the Service's position.

Comments addressed 14 primary issues, including concern over the impact of model airplane activities to wildlife, impact of model airplane flying on the quality of experience for Refuge visitors, diversion of Service resources to accommodate use, precedent set for model airplane flying throughout the National Wildlife Refuge System, and effect of model airplane flying on Refuge neighbors. Other issues addressed included contention over model plane flying practices or techniques and intensity of past use by modelers.

Several comments described observations of wildlife using flying areas simultaneous with model airplane enthusiasts. However, the vast majority of these observations were of species that are very adaptable and tolerant of human disturbance, including Canada goose, red-tailed hawk, American kestrel, turkey vulture, wild turkey, killdeer, barn swallow, raccoon, red fox, coyote, woodchuck, and whitetail deer.

Many comments disputed the anticipated impacts of model airplane flying upon wildlife, stating that the Galeville Army Training Facility supported a thriving bird community during the 26 year period that the site was used for model airplane flying, including the assemblage of grassland

bird species that currently occurs on the Refuge. However, model airplane advocates have not proven that negative impacts, such as decrease in nest productivity, did not occur. Presence of an adult alone is not an indication of successful nesting or undisturbed feeding or resting.

Several individuals questioned the calculation of costs associated with individual use and model airplane competitions. The cost of these calculations has been modified to increase the cost of biological monitoring and law enforcement and the size of the parking area needed, based on a more accurate, though probably still conservative, estimate of the level of use (based on information received from model airplane representatives). The cost has been decreased to eliminate charges for garbage collection and port-a-potty rentals during competitive events. These costs have historically been paid by the model airplane clubs and would continue to be the responsibility of the organizing club.

Many comments related cooperative use of areas administered by agencies or organizations with missions similar to the National Wildlife Refuge System. These comments are reviewed on pages 9 and10. Several comments questioned the allowance of hunting while disallowing model airplane use. This topic is discussed on page 10.

A portion of the comments described illegal activities. Some described poor behavior or offenses of model airplane enthusiasts, including trespass onto private property, and destruction of private property. Some comments expressed that the Service is not enforcing current regulations prohibiting hunting and ATVs on the Refuge and that these abuses are more harmful to wildlife than model airplane activities. However, the Refuge is regularly patrolled by law enforcement staff and these violations are rare. Further, this disturbance is minor compared to historic use of the site for model airplane activities and competitive events.

Determination:

___x___Use is Not Compatible
_____Use is Compatible With the Following Stipulations

Stipulations Necessary to Ensure Compatibility: No stipulations can be developed to ensure compatibility of this activity with the purpose of the Refuge or the National Wildlife Refuge System.

Justification: Model airplane flying and competitions are not compatible uses and will not be allowed on the Refuge. Both have direct and indirect effects on the wildlife being managed at the Refuge and the visiting public seeking a wildlife-dependant experience. More importantly, no evidence exists that the activities of modelers had no impact upon the nesting productivity of these grassland birds or wintering raptors. Clearly, sound professional judgment indicates that hundreds of people using the site through the nesting season, flying predator-shaped objects, and walking and riding motorized vehicles through fields would have a negative impact upon the breeding productivity of grassland birds. Several of the species using this Refuge are state-listed

endangered, threatened, or special concern species. Some of these are also target species for population stability and enhancement under the Partners in Flight program. This Refuge is one of the largest and most productive grasslands in the Northeast. The restoration and management of the site into a mosaic of grasslands to benefit a variety of grassland species and to facilitate wildlife observation, photography, interpretation and environmental education is the highest priority of this Refuge. Therefore, it is the determination of the Service that this use will materially interfere with and detract from the fulfillment of the National Wildlife Refuge System mission and the purposes of the Refuge.

Signature: **Refuge Manager:** Elizabeth A Herland 2/19/2002
(Signature and Date)

Concurrence: **Regional Chief:** Anthony D. Lege 2/20/2002
(Signature and Date)

Mandatory 10- or 15-year Re-evaluation Date: February 19, 2017

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APPENDIX: Organizations and agencies submitting comments on the draft Compatibility Determination on model airplane flying and model airplane competitive events at Shawangunk Grasslands National Wildlife Refuge.

Supporting

Audubon New York
American Birding Association
Buffalo Audubon Society
Brooklyn Bird Club
Defenders of Wildlife
Edgar A. Mearns Bird Club
Federation of New York State Bird Clubs
Friends of the Shawangunks
Fyke Nature Association
Genesee Valley Audubon Society
Great South Bay Audubon Society
John Burroughs Natural History Society
The Linnaean Society
Lyman Langdon Audubon Society
National Audubon Society
National Wildlife Refuge Association
New Jersey Audubon Society
New Jersey Department of Environmentat Protection
    Division of Fish and Wildlife, Endangered and Nongame Species Program
New Jersey Environmental Lobby
New York City Audubon Society
New York State Department of Environmental Conservation
    Division of Fish, Wildlife and Marine Resources, Region 3
    Division of Fish, Wildlife and Marine Resources, Endangered Species Unit
North Shore Audubon Society
Northern Catskills Audubon Society
Orange County Audubon Society
Public Employees for Environmental Responsibility
Putnam Highlands Audubon Society
Queens County Bird Club
Ralph T. Waterman Bird Club
Rockland Audubon Society
SUNY - College of Environmental Science and Forestry Birding Club
Wallkill River Task Force
Webster Groves Nature Study Society

189 letters from individuals

Opposed

Academy of Model Aeronautics
Auburn - Finger Lakes Radio Control Club
Barons Model Club
Brooklyn Skyscrapers Model Aeroplane Club
Button Valley Bombers
The Charles River Radio Control Club
East Coast Free Flight Conference
Englewood Flyers
Flying Dutchmen Aeromodelers
Hillsdale Flyers
Hilltop Radio Control Club
International Miniature Aircraft Association
Islip Model Aviation Society
Kent County Aeromodelers
Keystone Radio Control Society
Meroke Radio Club
Milwaukee Association of Radio Control Clubs
New England Sport Scale Association
Ocean County Modelers
Oregon Department of Fish and Wildlife
Pennsylvania Fun Flyers
Pinkham Field Irregulars
Rondout Valley Flyers
Society of Antique Modelers
Spirits of St. Louis Radio Control Flying Club
Sullivan Orange Ulster Radio Society
Top of New Jersey
Tuscon Free Flight Club
Valley Radio Control Flying Club
Vidalia Sky Vikings Radio Control Club
York Area Radio Control Club

1650 form letters from individuals

440 individual letters